CLAIMS

1. Ventilation device with a breathing gas source, a control unit, and a connecting device for connecting the device to a ventilation mask, where the control unit is connected to at least one sensor for detecting a test parameter, characterized in that

-- the control unit (1) has a step generator (19) for determining an at least temporary, essentially stepped change in the inspiratory pressure produced by the breathing gas source (20); in that

-- the sensor (15) is designed to measure a signal corresponding to the change in pressure and is connected to an analyzer (18), which evaluates the change over time in an analysis signal dependent on the measuring signal; and in that

-- the step generator (19) increases the pressure by a pressure step during a ventilation cycle following that in which measured value was evaluated if, after a predetermined time limit has elapsed following the pressure increase, the analyzer (18) determines that the analysis signal deviates from a limit value by more than a predetermined minimum difference.

2. Device according to Claim 1, characterized in that the analyzer is designed to evaluate the changes in the ventilation volume as an analysis signal.

3. Device according to Claim 1, characterized in that the analyzer (18) is designed to analyze a flow curve as an analysis signal.

4. Device according to one of Claims 1 to 3, characterized in that the analyzer (18) is designed to detect a decrease in the maximum ventilation volume from breath to breath at constant inspiratory pressure.

5. Device according to one of Claims 1 to 3, characterized in that the analyzer (18) is designed to detect a decrease in the flow occurring at a predetermined time after a sudden pressure increase.

6. Device according to one of Claims 1 to 5, characterized in that the sensor (15) is designed as a flow sensor.

7. Device according to one of Claims 1 to 6, characterized in that an integrator (17) is connected downstream from the sensor (15).

8. Device according to one of Claims 1 to 7, characterized in that the control unit (13) lowers the pressure by a pressure step via the step generator (19) the first time a reduction of the ventilation volume following a pressure increase is not detected.

9. Device according to one of Claims 1 to 8, characterized in that the control unit (13) is connected to a setpoint memory for ventilation volume setpoints.

10. Device according to one of Claims 1 to 9, characterized in that the control unit (13) is connected to a square-wave generator for defining the pressure curves during the inspiration and expiration phases.

11. Device according to one of Claims 1 to 9, characterized in that the control unit (13) is connected to a curve generator for defining the pressure curves during the inspiration and expiration phases.

12. Device according to one of Claims 1 to 11, characterized in that the analyzer (18) evaluates a pressure difference between the inspiration phases and the expiration phases.

13. Device according to one of Claims 1 to 12, characterized in that the step generator (19) lowers the expiratory pressure to increase the pressure difference.

14. Method for controlling a ventilator, in which a breathing gas source is controlled by a control unit as a function of at least one test parameter, characterized in that the

-- control unit (13) produces an at least temporary, essentially stepped change in the pressure generated by the breathing gas source (20); in that

-- the sensor (15) detects a measuring signal corresponding to the change in pressure; and in that

-- the change over time in an analysis signal dependent on the measuring signal is evaluated, and the inspiratory pressure is increased in a subsequent ventilation cycle whenever the analysis signal deviates from a limit value by a predetermined minimum difference at a minimum of one predetermined time.

15. Method according to Claim 14, characterized in that a decrease in the ventilation volume relative to the ventilation volume observed immediately after a pressure increase is

detected, and in that the control unit (13) increases the pressure precisely when the decrease in the ventilation volume exceeds a predetermined minimum difference after a predetermined time following the pressure increase has elapsed.

16. Method according to Claim 14, characterized in that, following an at least approximate step-like pressure increase, the pressure curve realized during the preceding breath is maintained if a decreasing flow at essentially constant pressure is detected after a predetermined time interval following the step-like pressure increase.

17. Method according to Claim 14, characterized in that the sensor (15) carries out a flow measurement.

18. Method according to Claim 15, characterized in that the volume signal is produced by integration of the flow signal.

19. Method according to one of Claims 14 to 18, characterized in that the pressure is lowered by a pressure step the first time a decrease in the ventilation volume following a pressure increase is not detected.

20. Method according to one of Claims 14 to 19, characterized in that the control unit (13) considers a target value for the ventilation volume.

21. Method according to one of Claims 14 to 20, characterized in that the ventilation pressure is controlled according to the course of a square-wave signal.

22. Method according to one of Claims 14 to 21, characterized in that the ventilation pressure is varied by the control unit (13) according to a predetermined pressure curve.

23. Method according to one of Claims 14 to 22, characterized in that a pressure difference between the inspiratory and expiratory pressure is determined.

24. Method according to one of Claims 14 to 23, characterized in that the pressure difference is increased by lowering the expiratory pressure.

25. Method according to one of Claims 14 to 24, characterized in that a pressure is changed from ventilation cycle to ventilation cycle.

26. Method according to one of Claims 14 to 25, characterized in that the pressure is held constant for at least two successive inspiration phases.

27. Method according to one of Claims 14 to 26, characterized in that the pressure is held constant for at least two successive expiration phases.

28. Method according to one of Claims 14 to 27, characterized in that the control unit (13) decreases the pressure only when an actual value of the ventilation volume exceeds the predetermined setpoint.

29. Method according to one of Claims 14 to 28, characterized in that, in a first step, the control unit (13) increases the pressure until the ventilation volume reaches the predetermined setpoint, and in that an additional pressure increase is then carried out.

30. Method according to one of Claims 14 to 29, characterized in that an at least approximate square-wave form pressure increase is selected for at least a single breath.

31. Method according to Claim 30, characterized in that the flow curve following the stepped pressure increase is analyzed for the presence of an increase to a maximum and a subsequent decelerating curve.

Druck = pressure

IPAP wird stufenweise erhöht = IPAP is increased in steps

IPAP wird auf vorheriges Niveau abgesenkt = IPAP is lowered to previous level

Zeit = time

Patient nimmt Eigenarbeit zurück = patient decreases spontaneous work

Vol. bleibt auf hohem Niveau = volume remains at high level

Vol. geht zurück auf Ursprungswerte = volume returns to original values

Figure 6. KEY:

Flow-Reaktion auf Rechteckkurve = flow reaction to square-wave curve

Druck = pressure

Standard-Beatmungsdruckkurve = standard ventilation pressure curve

Rechteckdruckkurve = square-wave pressure curve

Dezelerierender Flowverlauf bei passiver Lunge = decelerating flow curve in the case of a passive lung

Figure 2. KEY:

Volumen Vt = volume Vt

Beatmung = ventilation

Vergleichswert für Vt = reference value for Vt

Auswerteeinheit = analyzer

Druckgenerator = pressure generator

Figure 3. KEY:

IPAP wird stufenweise erhöht = IPAP is increased in steps

IPAP wird auf vorheriges Niveau abgesenkt = IPAP is lowered to previous level

Zeit = time

Vol. bleibt auf hohem Niveau = volume remains at high level

Vol. geht zurück auf Ursprungswerte = volume returns to original values

Patient nimmt Eigenarbeit zurück = patient decreases spontaneous work

Figure 4. KEY:

Vt wird kleiner = Vt becomes smaller

Patient nimmt eigene Atemarbeit zurück = patient decreases spontaneous respiratory work

Drucklufterhöhung = compressed air increase

Zeit = time

Figure 5. KEY: